Dermatology Review 2011

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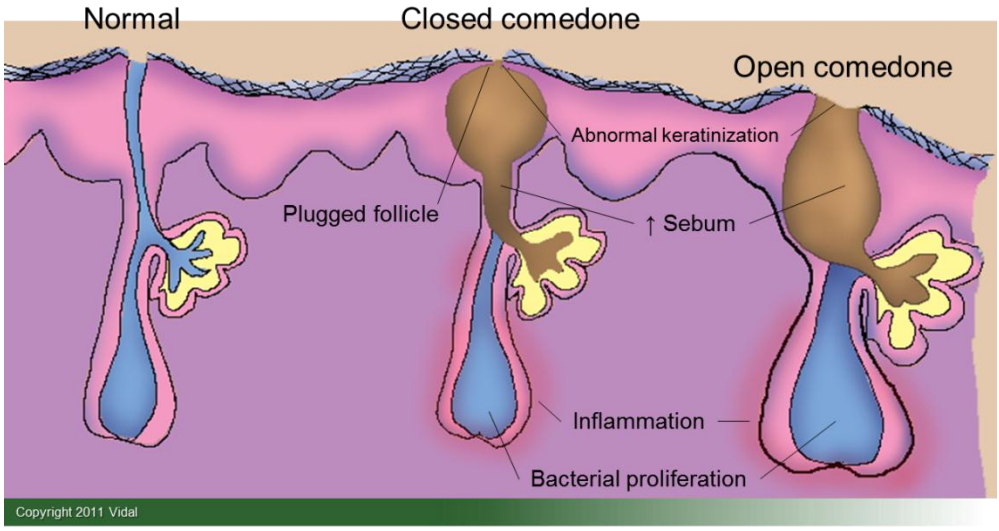
ACNE UPDATE

BASICS



Pathogenesis

- Keratinization
- Inflammation
- P. *acnes*
- ↑ Sebum

Therapy	Keratinization	P. acnes	Inflammation	↑ Sebum
Retinoids	+++	+	++	*
Benzoyl peroxide	+	++++	+	**
Azelaic acid gel	+++	+++	++	-
Antiandrogens	++	-	-	+++
TCN-based antibiotics	-	+++	++	-
Antibiotics***	-	+++	-	-
Isotrentinoin (Accutane)	+++	++	+++	++++

Adapted from: Williams HC, Dellavalle RP, Garner S. Acne Vulgaris. Lancet. 2011 Aug 29. [Epub ahead of print].

- = no effect
+ = weak effect
++ = moderate effect
+++ = strong effect
++++ = very strong effect

* Reduction offset by increased excretion?
** Actually increases sebum excretion.
*** Clindamycin has weak effect on keratinization

DIET.

- Nothing conclusive:
  - Old studies biased/inaccurate.
  - Non-western societies with low glycemic index diet have no acne, until they become westernized.

- Recent review* (2009) looking at acne and diet in the literature:
  - Poor study designs.
  - Self-reported outcomes.

- Culprits?:
  - High glycemic index diet.
  - Dairy products (milk).
  - No relation to weight, BMI, cholesterol, triglycerides, or blood glucose levels.

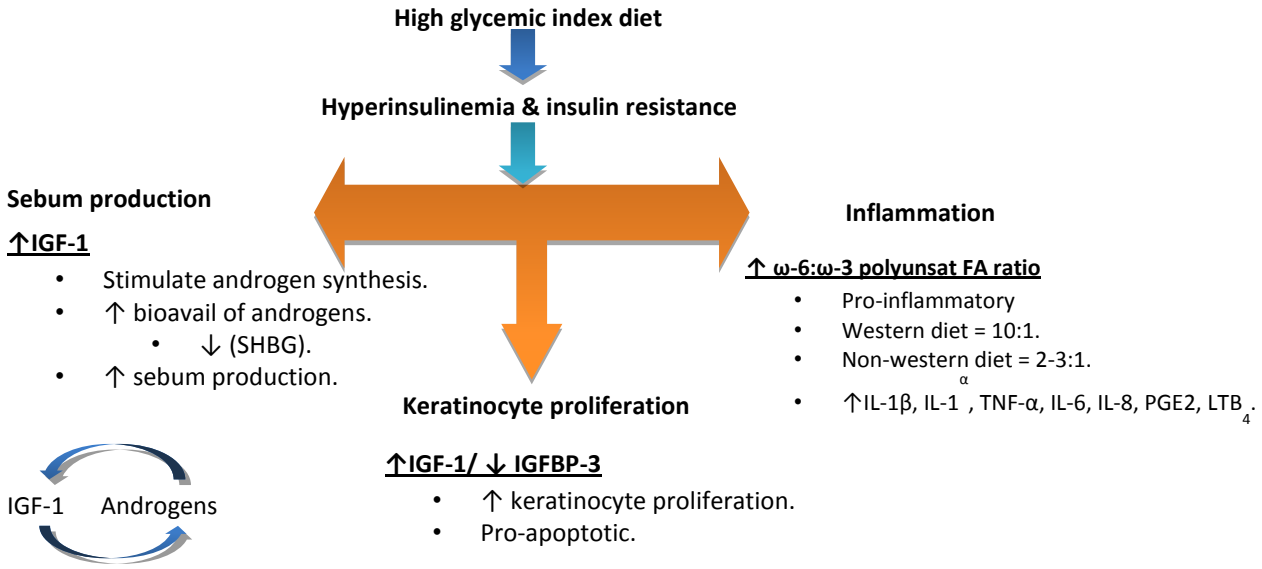
- Delayed menarche with low glycemic index diets (e.g. athletes, ballerinas).

- Menarche (1970's – 1990's, 2 ½ month drop*).
  - 1835 – 16 yo.
  - 1900's – 14 yo.
  - 1973 – 12.80 (W), 12.52 (B)
  - 1993 – 12.88 (W), 12.16 (B)

Unprocessed

Processed

Glycemic Index		
Low	**< 55**	**Fruits, veggies, whole grains, nuts.**
Medium	**55-69**	**Whole wheat, sweet potato, baked potatoes**
High	**≥70**	**White bread/rice, corn flakes, glucose.**



Milk

- Low glycemic index.
- Paradoxical ↑ IGF-1.
  - Fat-free milk > regular milk.
    - ↑ bioavailability of comedogenic factors.
    - Whey proteins added to simulate whole milk.
      - Whey protein - most potent stimulator of glucose-dependent insulinotropic polypeptide (stimulates pancreatic insulin secretion).*
  - Milk contains: (>80% of milking cows are pregnant).
    - androgen precursors.
    - Glucocorticoids.
    - TGF-β.
    - Hormone peptides (similar to opiates & thyrotropin).
    - Iodine – can exacerbate iodine.
  - Supplemented in animal diet.
  - Found in iodine solutions in milking equipment.

Acne & Diet bottom line:

- Controversial:
  - 2 studies (40+yrs ago) – diet not a factor in acne.
  - Epidemiological evidence/ newer studies indicate link.
  - Recent review* (2009):
    - Poor study designs.
    - Self-reported outcomes.

BENZOYL PEROXIDE.

- Mid-1970's P. acnes resistant strains emerge.
- Failure of antibiotic monotherapy.
- BPO mechanism of action:
  - Bacteriocidal.
  - Comedolytic (mild).
  - Anti-inflamatory (mild)
  - ↑ sebum production (*obstruction removal*).
  - 22.5% ↑ after 1-2 months use.
- Prevents development of resistance.
- No difference in BPO: 2.5%, 5%, or 10%.
- Combination of antibiotics & BPO superior to monotherapy.
- Use with retinoids enhances efficacy.

ORAL CONTRACEPTIVES

- Cochrane Review* (25 trials) of combined OCP's (COC's) in acne.
  - OCP's reduced:
    - Acne lesion counts.
    - Severity grades.
    - Self-assessment scores.
- Known efficacy:
  - Ortho Tri-cyclen.
  - Yaz.
- Antibiotics & OCP's:
  - Griseofulvin
  - Rifampin
  - No assoc. b/w antibiotics & risk of breakthrough pregnancy [COC](n = 17,721).**
    - Can't rule out a risk (limited power of study).

DERMATOLOGY PEARLS

CONFLUENT AND RETICULATED PAPILLOMATOSIS

Confluent and reticulated papillomatosis (CARP) was discovered in 1927 by Gougerot and Carteaud. This condition is most commonly seen in the setting of suspected tinea versicolor that does not seem to respond to therapy. The etiology is unknown with many theories postulated:

- Obesity.
- Abnormal keratinization.
- UV light
- Endocrine imbalance
- Hyperthyroidism (n=1)
- Infection: Malassezia species (T. versicolor).

Often occurring in late teens to 20's, with an equal sex distribution.

DDx:

- Tinea versicolor
- Acanthosis nigricans.

CARP

- Etiology: Unknown.
- Asymptomatic
- No scale (*co-infected?*)
- Hyperpigmented/brown
- Persistent

TINEA VERSICOLOR

- Etiology: Malassezia* yeast
  - *globosa, furfur, sympoidalis.*
- Asymptomatic
- Fine scale
- Hypo- & hyperpigmented.
  - Azelaic acid blocks melanin prod
  - Melanin producing strains.
- Recurring
  - Summer (60-80% recur)

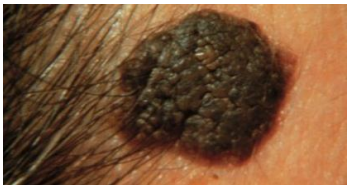
Diagnostic criteria for CARP (refer to dermatology)**:**

- Clinical findings:
  - Scaling brown macules and patches.
  - Reticulated and papillomatous.
- Involvement of upper trunk and neck.
- Negative fungal staining (KOH).
- No response to antifungal treatment.
- Excellent response to minocycline.

Treatment of CARP (recommend dermatology referral):

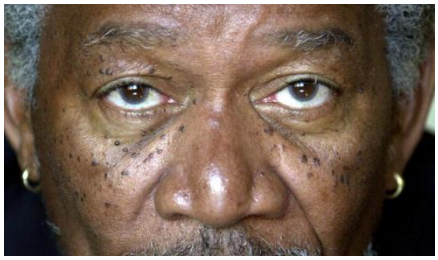
- Minocycline (50-80%)
  - 100mg po bid x 1-2 mo.
- Azithromycin
  - 250mg-500mg po 3x/week
- Isotrentinoin.

SEBORRHEIC KERATOSIS



Seborrheic keratoses(SK) are second only to atypical moles in frequency of dermatology consults, in my experience. These benign lesions have no malignant potential, but can have an ominous appearance. The varied morphologies of SK's have led to some confusion surrounding these lesions. On forearms and backs of hands, the lesions are often very flat, and confused with solar lentigos. On the torso and head and neck, they are raised. They can be skin-colored to very dark black in color, and can have asymmetric pigmentation. SK's are seen in 40-50 year olds. However, in Australia, they can occur as early as 15 years old in 20-24% of individuals.

SK's are classically described as having a well circumscribed, "**Stuck-on**" appearance. They have a warty (aka verrucoid) surface texture. In fact, in they are called seborrheic warts in England. The surface texture has also been described as resembling the surface of a human brain (aka cerebriform), or resembling a thimble. One characteristic that helps me verify that the lesion is an SK, is that it has a very characteristic appearance when treated with liquid nitrogen – the crypts and comedone-like openings on the surface are enhanced.



These lesions are usually not treated, unless they are on the face, or along bra strap lines or interfere with wear of military clothing. They are often seen on the underside of pendulous breasts. Some of the many variants of SK's include stucco keratoses, and dermatosis papulos nigra. Stucco keratoses are found on the legs of older men, and are associated with dry skin. They look like white stucco. Treatment for these is ammonium lactate topical lotion p.r.n. Dermatosis papulosis nigra (DPN) are variants of SK's in dark skinned individuals. These lesions are completely benign and found periocularly and along the anterior-lateral neck areas. Treatment involves elective hyfrecation.

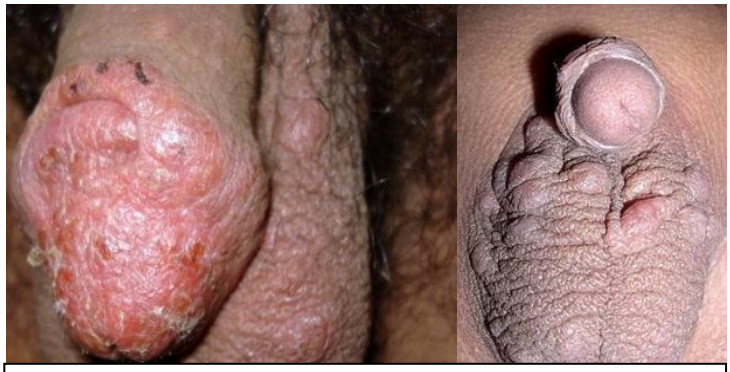
GENITAL WARTS, OR NOT?

One of the most common consults to dermatology is the "rule out genital warts" consult. This is not surprising, given the prognostic, cultural, emotional, and psychological ramifications of the diagnosis. In my experience, the majority of external genital warts in women are referred to OB/GYN service, leaving male genital lesions to the dermatologist. Generally, almost any lesion that can occur anywhere else on the body can occur on the genitals. This can make the differential diagnosis quite broad and intimidating.

Condyloma accuminata. ©2011, Vidal EM

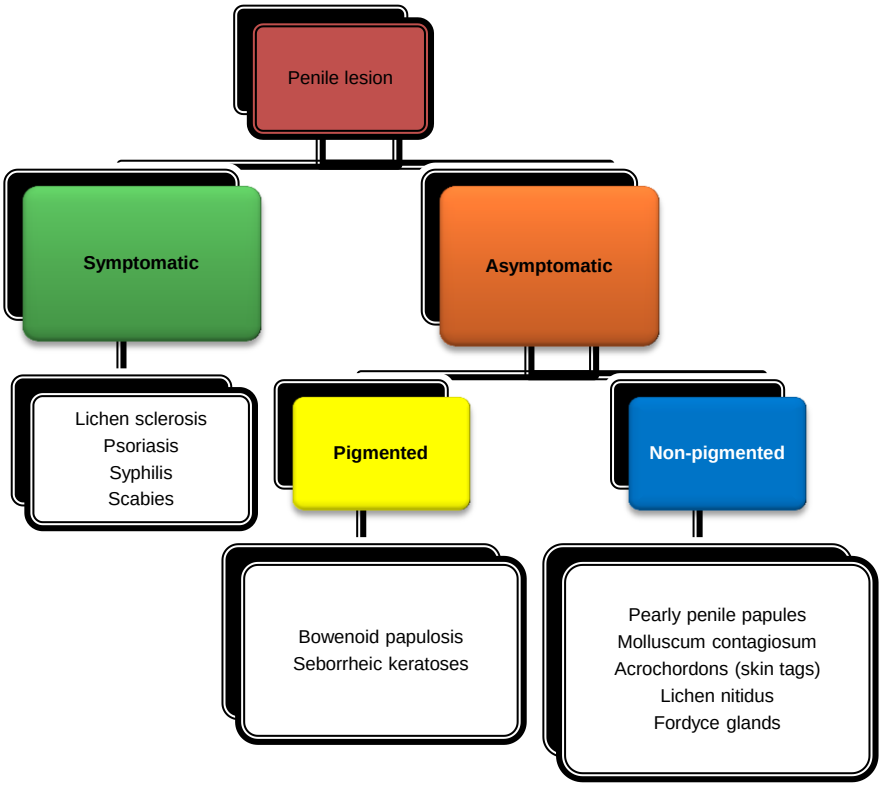
Condyloma accuminata (genital warts) are generally asymptomatic soft, fleshy, skin-colored, either sessile or pedunculated growths. Acetic acid whitening of lesions is not commonly practiced these days, as many lesions other than warts will whiten with this technique. Ultimately, a skin biopsy may be required for definitive diagnosis.

First exclude symptomatic lesions, which will lead to an entirely different differential diagnosis. One commonly missed symptomatic genital lesion is scabies. Scabies lesions on the genitalia are extremely pruritic, as in non-genital lesions, and are often pink papules or nodules, with or without overlying scale. This appearance is so characteristic, that multiple pink pruritic papules on the scrotum/penis should be considered scabies until proven otherwise.

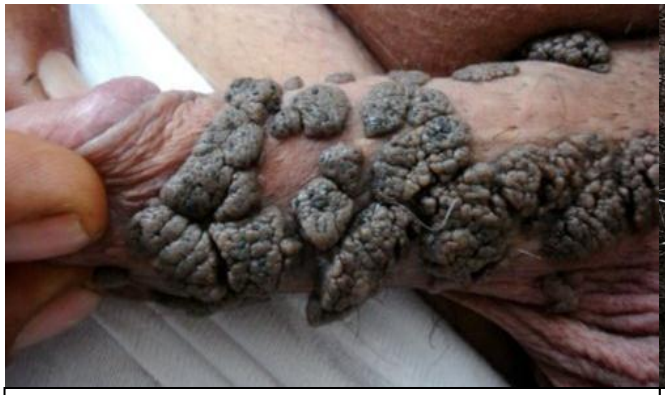


Scabies. Global skin atlas.com

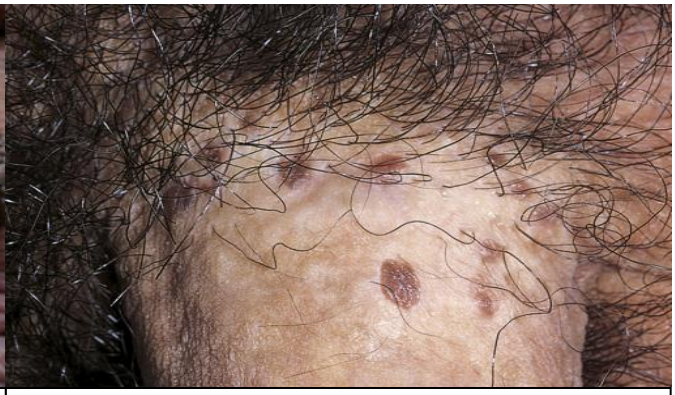
Common asymptomatic lesions that can be confused with condyloma accuminata can be divided into two groups: (1) pigmented, and (2) non-pigmented variants. Pigmented mimics include bowenoid papulosis and seborrheic keratoses. Non-pigmented mimics include pearly penile papules, molluscum contagiosum, acrochordons (skin tags), lichen nitidus, and Fordyce glands.



BOWENOID PAPULOSIS



Bowenoid papulosis. Global skin atlas.com

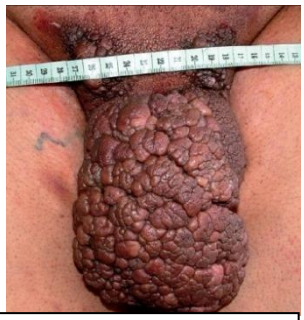


Bowenoid papulosis, © Vidal EM.

Bowenoid papulosis are premalignant papules, that similar to genital warts, are induced by Human papilloma virus (HPV). They can be skin-colored, brown or red, with either a flat surface texture, or a warty like surface (aka verrucoid). Unlike genital warts, these lesions are caused by high risk HPV subtypes (e.g. *HPV 16, 18*, 31, 32, 33, 34, 35, 39, 42, 48, 51, 52, 53, and 54). These lesions demonstrate full-thickness cellular dysplasia (i.e. squamous cell carcinoma in-situ) and carry a 2.6% risk of malignant invasive transformation. Often treated as genital warts, without a biopsy, the true incidence is unknown. These lesions are treated by local destruction – just like genital warts. However, because they are induced by high risk HPV subtypes, it is advisable to biopsy pigmented genital warts to exclude bowenoid papillomatosis.

SEBORRHEIC KERATOSES

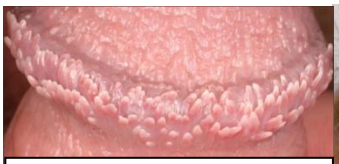
Seborrheic keratoses occur on all hair bearing areas, and are not seen in glaborous (non-hair bearing) sites such as the glans penis. When located on the penile shaft or perineum, the verrucoid (warty) surface texture and pigmentation can lead these lesions to be confused with bowenoid papillomatosis. In the absence of dermatoscopic features of seborrheic keratoses, these lesions are often biopsied for definitive diagnosis.



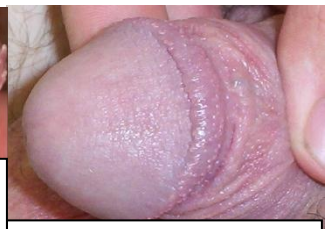
Thakur JS, et all. Giant pedunculated sk of penis. Indian J Dermatol. 2008 Jan-Mar; 53(1): 37–38

PEARLY PENILE PAPULES

Developing after puberty, these benign asymptomatic lesions are found in approximately 14-48% of males. Highest incidence is found among blacks and uncircumcised. Measuring 1-4 mm in diameter, they occur singly or in rows on the corona of the glans. Unlike genital warts, they are not verrucoid, and do not occur on the shaft.



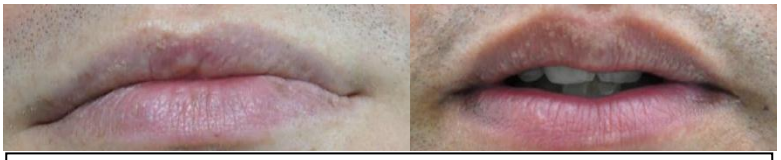
Körber A, Dissemond J. Pearly penile papules. CMAJ. 2009;181(6-7):397. Epub



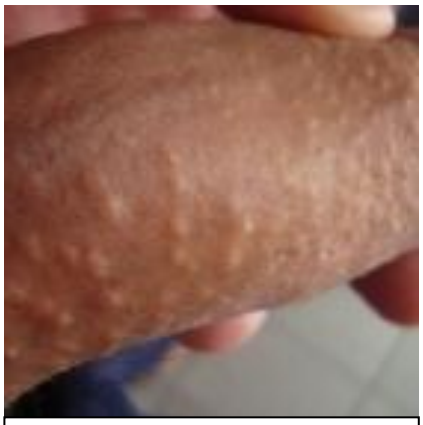
Global Skin Atlas.com

FORDYCE GLANDS

Named after dermatologist John A. Fordyce, Fordyce glands are benign ectopic sebaceous glands located on the lips, penis or labia. Patients are often referred to dermatologists because of concern over possible genital warts. Unlike genital warts, these lesions are subcutaneous and are best visualized by tightening the skin of the shaft. No treatment is required. Generally, treatment can lead to unnecessary scarring.



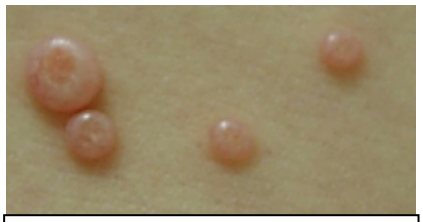
Fordyce glands. ©2011, Vidal EM



Fordyce glands on penis. http://www.pearlypenilepapulestreatments. com/

MOLLUSCUM CONTAGIOSUM

Molluscum contagiosum, a viral infection that affects primarily children aged 1-10 years old, can easily be confused with genital warts in adults. This virus can be sexually transmitted (consider after 12 years old). The clue to this diagnosis is that the lesions are very monomorphic in appearance. They appear as very smooth pink to skin-colored flat-topped dome shaped papules with a characteristic central dimple. Unlike genital warts, these lesions are not associated with malignant transformation. Since the virus is limited to the skin, once all the lesions resolve, there is no risk of recurrence – unlike genital warts.



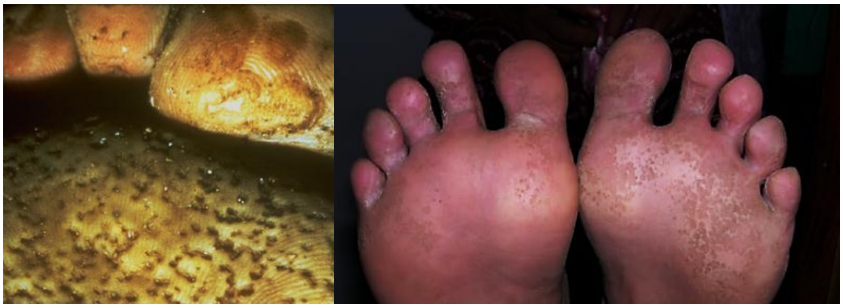
www.CDC.gov

LICHEN NITIDUS

Lichen nitidus is a fairly uncommon, usually asymptomatic dermatosis. The lesions present as multiple pin-head-sized papules on penile shaft. Although usually localized to torso, generalized variants have been described. These lesions tend to self-resolve, but have an unpredictable clinical course. Rare pruritic generalized variants have been described. No treatment is needed.

Fitzpatrick's Color Atlas and Synopsis of Clinical Dermatology, Sixth Edition. Copyright 2009

PITTED KERATOLYSIS



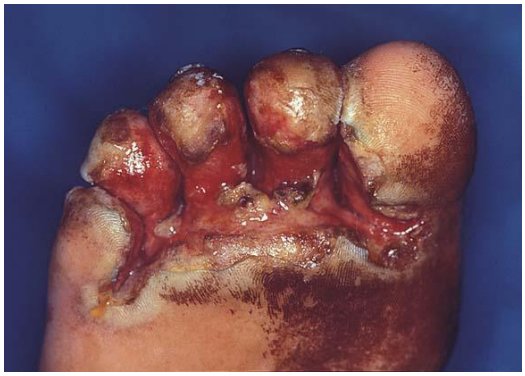
Pitted keratolysis is a common dermatosis in populations that where protective footwear or boots for extended periods of time (e.g. military troops). It is often confused with fungal infections and treated for many months to years without improvement. It is caused by Corynebacterium Sp (Kytococcus sedentarius).

According to a recent study (n=53), the mean age is 24.9, with a male to female ratio of 7.8:1, with most patients experiencing bilateral lesions (92.4%). The Corynebacterium thrive in warm, moist environments and eat the superficial dead skin layer. Antibacterial skin peptides and host defenses limit infections to the upper layers of the epidermis. The characteristic lesions are pitted or punched out areas on whitish or macerated plantar surfaces, with a foul odor and hyperhidrosis.

Treatment involves topical clindamycin or erythromycin, plus aluminum chloride for 1-2 months.

GRAM NEGATIVE TOE WEB INFECTIONS

Gram negative toe web infections are one of the most commonly misdiagnosed disorders referred to dermatologists. The most common presentation is a case diagnosed as tinea pedis by a primary care provider , that persists for months, and does not respond to oral antifungals. Risk factors include: previous tx for tinea pedis (56%); allergic contact dermatitis (20%); hyperhidrosis (14%); swimming pools, public baths, dressing rooms, saunas, hot tubs, etc…



In reality, gram negative toe web infections are polymicrobial with gram negative bacteria (e.g. Pseudomonas) playing a major role. The disease starts out as a fungal infection in someone with tight-fitting shoes, or occlusive/protective footwear (e.g. boots). As the fungus is treated, local gram negative flora proliferate. Often, providers will perceive this as a worsening of the

fungal infection and add oral antifungals. Then, when the feet become macerated and foul smelling, a series of antibiotics erroneously targeting gram positive organisms are used – which fails to improve the condition. Effective teatment involves targeting gram negative organisms and fungi together, addressing the maceration, and eliminating the predisposing factors (e.g. moist, warm, occlusive environment.

Tx:

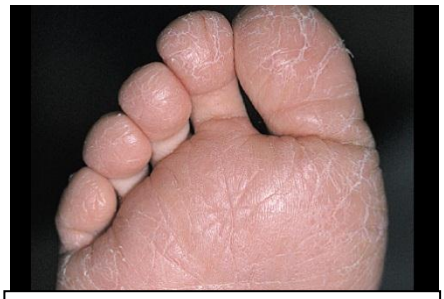
- **Culture first!** To check sensitivities.
- Debride all macerated dead skin.
- Domeboro soaks for 15-30 minutes, 3-5 times a day.
  - Ciprofloxacin 500mg po bid x 14-21 days. (check sensitivities).
- Econazole nitrate cream AAA bid for 1 month.
  - Alternatives: Naftin AAA qday for 1 month.
- Soft shoe profile for 1 month.
- Drysol (aluminum c hloride) AAA qhs for hyperhidrosis.

	Isolated pathogens	%
Gram-	***Pseudomonas aeruginosa***	**46.4**
	Escherichia coli	13.8
	Proteus mirabilis	7.8
	Morganella morganii	7.08
	Enterobacter cloacae	7.08
	Klebsiella pneumoniae	6.2
	Acinetobacter spp	5.5
	Serratia marcescens	3.1
	Alcaligenes faecalis	3.1
Gram- & Gram+	*Staphyloccocus aureus*	8
	Staphylococcus saprophyticus	2
	Coagulase-positive staphylococci	2
	beta-Hemolytic *Streptococcus*	5
Fungi & Gram-	*Candida albicans*	5
	Dermatophytes	1
Fungi after Gram- recovery	*C albicans*	28.5
	Trichophyton mentagrophytes	6.5
	Trichophyton rubrum	4.0

Aste N, et all. Gram-negative bacterial toe web infection: A survey of 123 cases from the district of Cagliari, Italy. Journal of the American Academy of Dermatology - Volume 45, Issue 4 (Oct 2001)

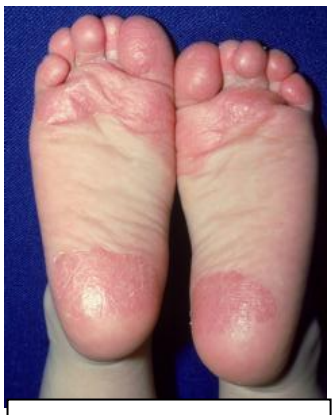
JUVENILE PLANTAR DERMATOSIS

Juvenile plantar dematosis (aka sweaty sock syndrome), is a variant of eczema. It occurs in small children (<10yo), who wear occlusive shoes daily (leather uppers) or who walk on swimming pool decks or course terrain. The combination of moist environment (repeated wet-dry cycles) and friction causes this dermatosis, which is found on the weight-bearing areas of the plantar surfaces. The skin on children's plantar surfaces is not as resilient as it is in adults. There is desquamation and denuded skin leaving a "glazed donut" appearance that spares the toe webs.



http://www.medicinenet.com/

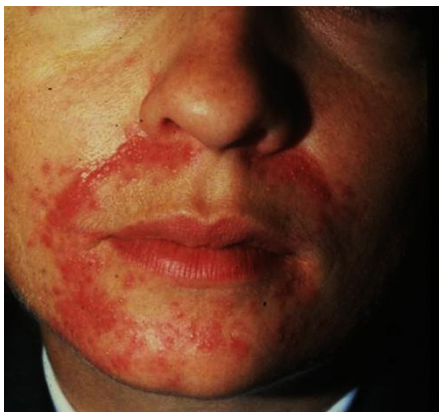
Treatment involves moisturization, elimination of occlusive (leather upper) shoes/boots, avoidance of repeated wet-dry cycles (swimming pool), and frequent sock changes. Topical corticosteroids have no effect. This resolves slowly as the child ages.



http://www.skintight.com/

PERIORAL DERMATITIS

Perioral dermatitis affects women aged 19-40 years old and is associated with chronic use of potent fluorinated topical corticosteroid use. The usual cause is a poor understanding of the mechanism of action of corticosteroids, leading to an erroneous belief that daily use of steroids will keep their face clear of lesions.

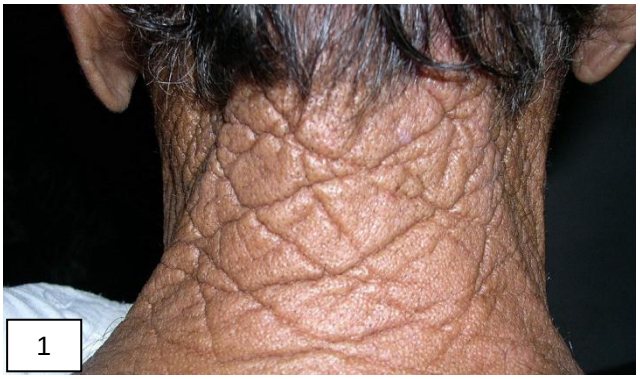


The lesions are erythematous papules, vesicles or pustules that spare the vermillion border. The periocular areas and glabella can also be affected.

Treatment:

- Stop all topical corticosteroids for 1-2 months.
- TCN 250 mg QID x 6 wks
- E-mycin 250 mg BID x 6 wks
- Clinda or E-mycin soln bid.
- Tacrolimus or Elidel topical.
- Avoid moisturizers.

SKIN FINDINGS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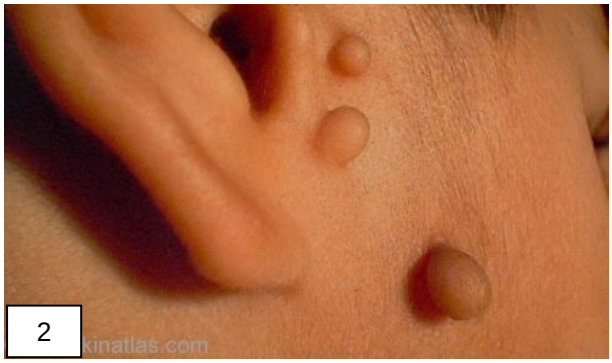
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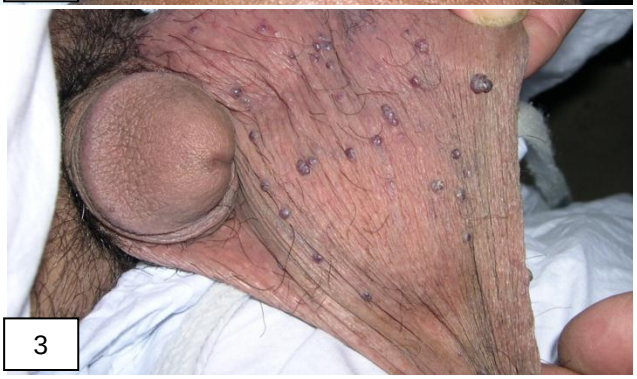
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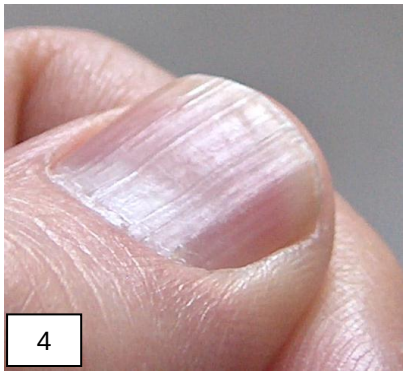
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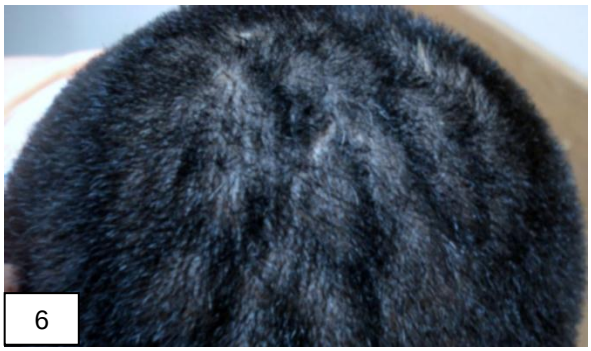
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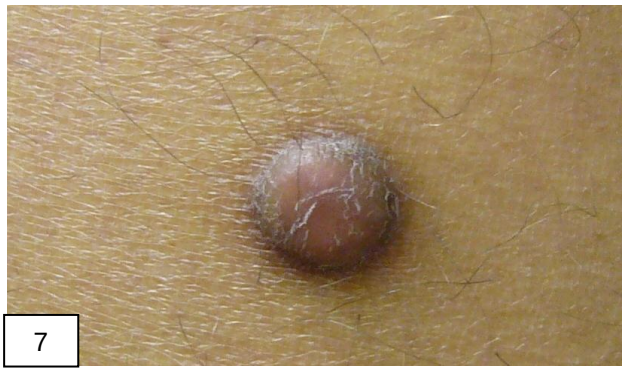
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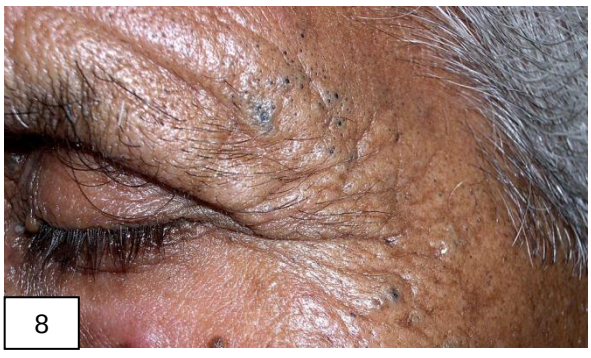
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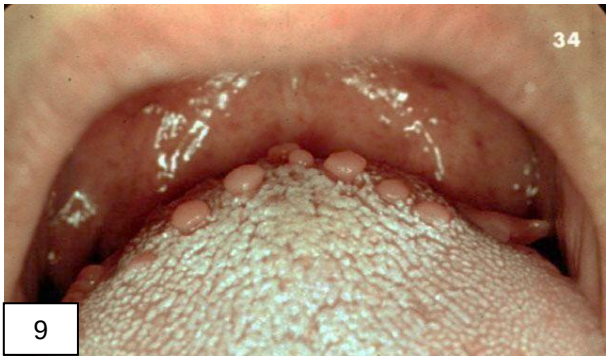

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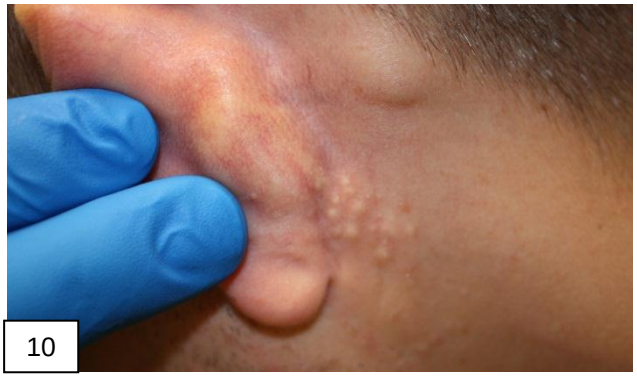
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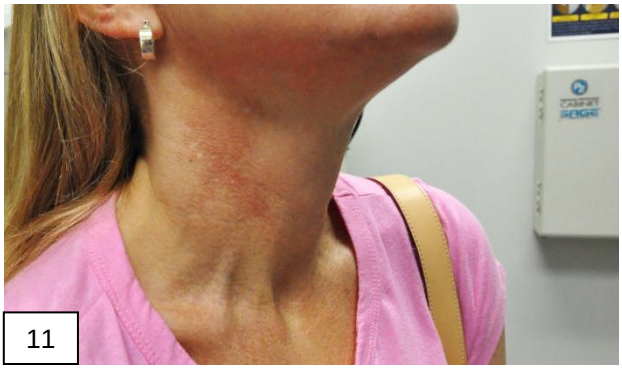
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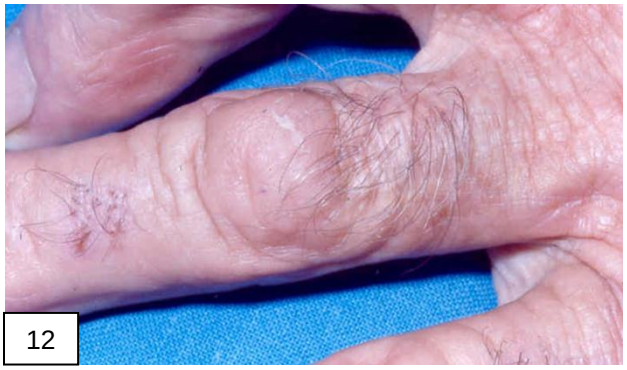
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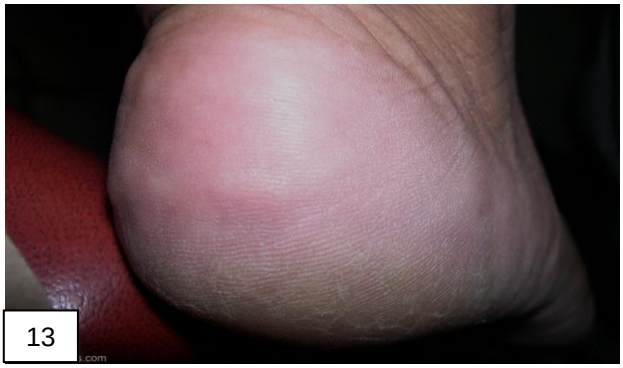
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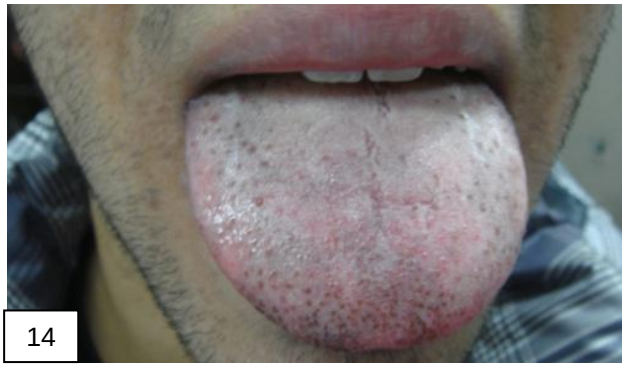
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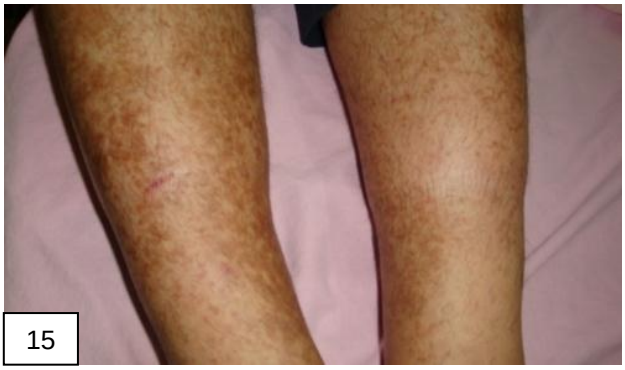
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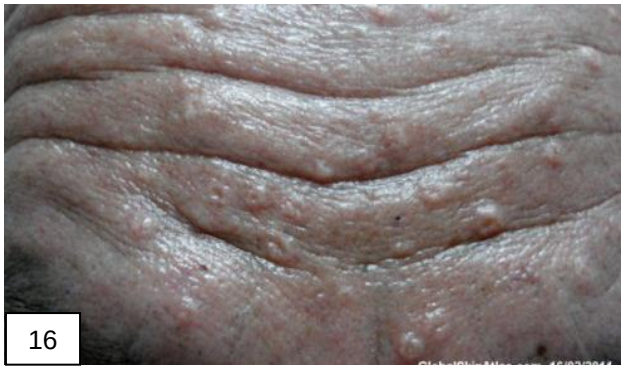
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1. Cutis rhomboidalis nuchae.
2. Accessory tragus.
3. Angiokeratoma of the scrotum
4. Vertical nail ridges.
5. Trachyonychia.
6. Cutis verticis gyrate.
7. Dermatofibroma.
8. Favre-Racouchot syndrome.
9. Circumvallate papillae.
10. Milia en plaque.
11. Poikiloderma of Civatte.
12. Knuckle pads.
13. Piezogenic pedal papules.
14. Pigmented fungiform papillae of tongue.
15. Schamberg's purpura.
16. Sebaceous hyperplasia.

OFFICE PROCEDURES

CRYOSURGERY

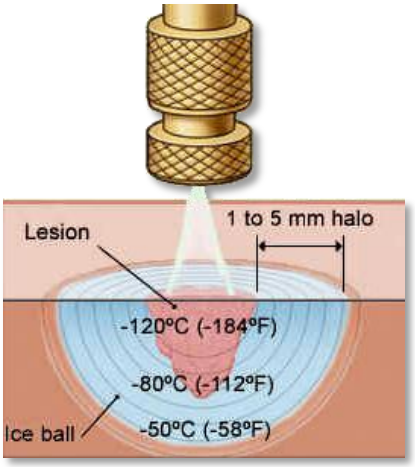
- Why so popular:
  - Quick & Easy.
  - Safe.
  - Bloodless.
  - No anesthesia
  - Cost effective.
  - Excellent cosmetic results:
    - Patient selection.
    - Spares tissue fibroblasts.
  - Predictable results with practice.
  - Safe in pregnancy.

- GOAL = Rapid Freeze, Slow Thaw, & Repeat
  - Cooling:
    - Rapid: Intracellular (lethal) crystals.
    - Slow: Extracellular (non-lethal) crystals.
  - Rewarming:
    - Slow: small crystals re-crystallize into larger ones
    - Fast: quick melting; crystals stay small.

- Effects of freezing:
  - Immediate
    - Ice crystals
    - Dehydration
    - Protein denaturization.
  - Delayed (Vascular stasis)
    - Within a few hours.
    - Clumping, packing, adherence of RBC's.
  - Late (Immunological)
    - Theoretical tumor-specific transplantation immunity.
    - Evidence: induced immune response at treatment sites.

Cryogens

- Verruca-Freeze (chemical refrigerant)
  - - 70-90 °C
- Dry ice (Carbon dioxide):
  - - 78 C
- Nitrous oxide (Cryoprobe)
  - -89 C
- Liquid nitrogen:
  - -180 C (spray)
  - -96 C (probe)
  - -20 C (CTA)
  - boiling point: -196 C (-320.8 F).



Depth correlates to halo size.
0-1 mm: benign/superficial.
1-2 mm: premalignant/deeper.
5 mm: malignant.

Indications:

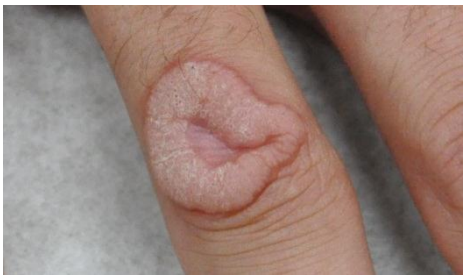
- Seborrheic keratoses.
- Skin tags.
- Lentigos.
- Actinic keratoses.
- Warts.
- Molluscum contagiosum.
- Cutaneous Leishmaniasis
- Pyogenic granuloma

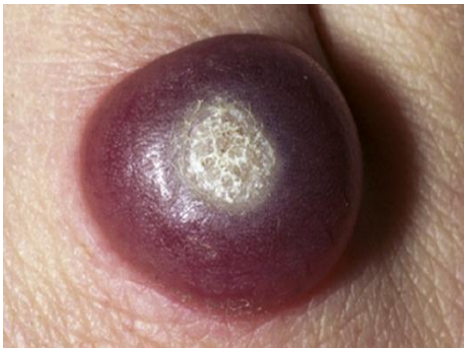
Treatment	Efficacy (during/3 mo F/U)	Frequency
Cryosurgery	80% / 55%	Every 2-4 weeks
Hyfrecation	95% / 70%	Varies
Trichloroacetic acid (TCA) * Not for external warts (ulcerations).	<78% / 45%	weekly/bi-weekly
Imiquimod (Aldara)	50% overall; 22% recurrence	3 days/week x 16 wks
Interferon-α (intralesional)	40-60% overall	
Interferon-α (Systemic)	20% overall	

Treatment	Clearance	3 month Follow-up
Podophyllin	41	17
Cryosurgery	79	55
Hyfrecation	94	71

Complications:

- **Immediate**
  - Pain
  - Blister (blood filled)
- **Delayed**
  - Scar
  - Neuropathy (damage to lateral finger nerves).
  - Hypopigmentation
  - Ring wart phenomenon
- **Permanent**
  - Hypopigmentation
  - Ectropion/notched eyelids
  - Atrophy
  - Alopecia
  - Mallet finger deformity

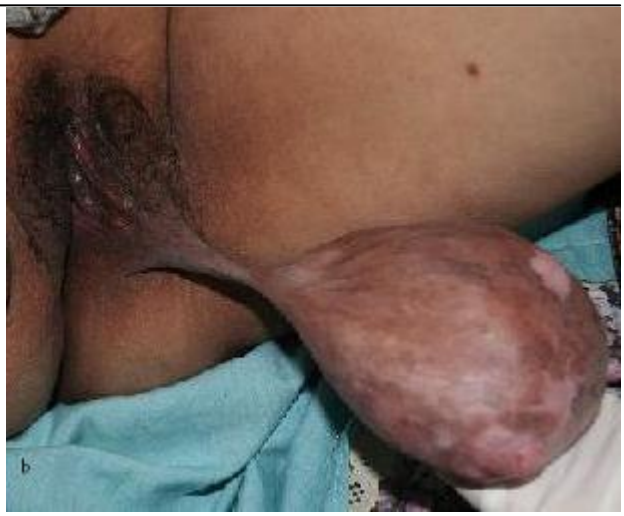




Lesion	CPT Code
Benign or premalignant lesions (e.g. Seborrheic keratoses, actinic keratoses)	17000 (1st lesion) 17003 (2-14 lesions) 17004 (> 15 lesions)
Warts/Molluscum contagiosum	17110 (1-14 lesions) 17111 (>15 lesions)
Acrochordon (skin tag)	11200 (1-15 lesions) 11201 (each additional 10 lesions)
Eyelid lesions	67840
Penile lesions	54056 (simple) 54065 (extensive)
Anal lesions	46916 (simple) 46924 (extensive)
Vulvar lesions	56501 (simple) 56515 (extensive)

ACROCHORDON (SKIN TAGS)

- Common in obese; familial pattern seen
- DDx:
  - Nevi.
  - Neurofibromas.
  - Nevus lipomatosis superficialis.
  - Fibroepithelioma of Pinkus (lower back).
- Treatment:
  - None.
  - Snip excision.
  - Cryosurgery.
  - Electrodessication.
- Send the following to path:
  - HIV.
  - Lower back skin tags.
  - Immunosuppressed.



NEVI: BENIGN OR MALIGNANT?

Nothing causes more anxiety and confusion for primary care providers than pigmented nevi (moles). The most common question I get by both patients and primary care providers is, "How can I tell if I need to worry about a mole?" This is probably second only to the favorite, "How much is this going to cost?" The truth is that there is no perfect system to routinely identify which lesions are benign and which are malignant, that can be applied by providers of all skill levels. Perhaps the better question is "Which ones should I biopsy?" The logical follow up question, "how should I biopsy it?" will be answered in the procedure portions of the lectures (see "Office Procedures" section).

First, let's begin by discussing some of the most popular systems used to teach providers about abnormal nevi. We should note, that dermoscopy, a technique using polarized light to view architectural features of lesions, which is now widely practiced by dermatologists, has increased our ability to sort out benign versus suspicious lesions in clinic. The down side is that it literally takes three or so years of daily use to get really good at the technique, and unless you have the luxury of using one during a dermatology residency, or plan on practicing daily with the technique, it is recommended that this tool be avoided, as someone could be falsely led to believe a lesion is benign, when in fact it is malignant. A 2007 meta-analysis in 2002 verified that increases in diagnostic accuracy with dermoscopy was related to experience, with little or no training resulting in no improvement in accuracy of diagnosis when using dermoscopy. A simple magnifying glass with an attached light is inexpensive and ideal for evaluation of all lesions.

Providers should note that the majority of malignant lesions are identified by patients and brought to the attention of providers. In general, routine skin self-examination sensitivity ranges from 25-93%, with a specificity of 83-97%.

Studies support the superiority of melanoma diagnosis when performed by dermatologists, as compared to general surgeons and general practitioners. Even though dermatologists are the best at identifying suspicious lesions, no one is perfect. Some studies have sensitivities of 80% and only 70% diagnostic accuracy.

What is considered a lot of moles?

Having more than 25-100 melanocytic nevi has been considered a risk factor for melanoma, with a relative risk of melanoma between 1.2 - 46.5.

ABCDE rule

A – asymmetry
B – border
C – color
D – diameter
E - evolution

When evaluating patients with multiple nevi, we need a systematic approach. Common approaches to identifying suspect melanocytic lesions are the ABCDE rule, the three C's, and the "ugly duckling" sign. The literature supports all these methods, and none has been found to be definitively superior to the other. Each have strengths and limitations. The point is to use some type of systematic approach, so that you can ensure consistent and reproducible results. A 2005 prospective survey found that most providers do not mentally follow an algorithm when evaluating lesions, but instead rely on overall pattern recognition, the "ugly duckling" sign, and a history of change in a lesion to determine need to biopsy.

The three C's

C – color
C – contour
C – change

The ABCDE rule limitations include the fact that small early lesions and amelanotic melanomas can be missed, and that benign seborrheic keratoses meet criteria as "suspicious". Early melanomas smaller than the "pencil eraser" size or 6 mm could be missed if we used these criteria.

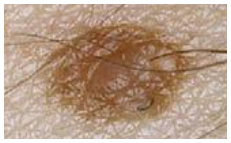
The approach I use to identify which nevi that require biopsy/excision is to first define what is considered an atypical nevi, identify the ugly duckling, and then identify and exclude signature nevi, and nevi from the same "family" (aka regularly irregular nevi). Any lesions left (if any), should then be biopsied. Atypical nevi are defined clinically as having at least 3 of the 5 features:

- Ill-defined border.
- Irregular border.
- Irregularly distributed pigment.
- Background erythema.
- Larger than 5 mm.

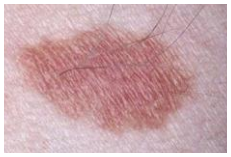
Gameplan:

1. Identify:
   - Higher risk (> 25 nevi).
   - Atypical nevi.
   - Ugly duckling(s).
2. Exclude:
   - Benign signature nevi.
   - Regularly irregular nevi.
3. Biopsy what's left.

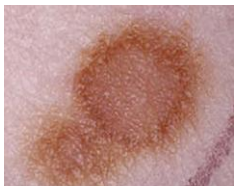
The "ugly duckling" is just what the name implies – of all the nevi, pick the ugliest or most atypical appearing nevus. Picking the "ugly duckling" is actually a pretty good way to simplify things, and has served many primary care providers well over the years. The concept of signature nevi was introduced by Suh and Bolognia in 2009. The different types of signature nevi are the (1) solid brown; (2) solid pink; (3) Eclipse; (4) Pink eclipse; (5) Cockade; (6) Perifollicular hypopigmentation; (7)) Non-pigmented nevi; (8) Fried-egg; (9); Cheetah or Lentiginous nevi; and (10) Halo nevi. These nevi are mostly considered benign, despite their sometimes worrisome appearance. However, the solid pink nevus can be deceiving, and can be the most dangerous nevi of the bunch. Its absence of pigment can make identifying these nevi as benign or malignant. Change in these nevi is sometimes the only clue you get, so biopsy them when patients tell you they have changed. The Cheetah subtype is associated with an increased risk of melanoma because of the increased number of melanocytic nevi present in comparison to the other types of signature nevi.



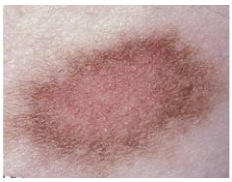
Solid Brown Nevus
- Smooth, well defined border.
- Symmetric appearance.
- Uniform brown color.



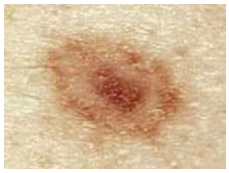
Solid Pink Nevus
- Fair skinned individuals.
- Dangerous since absence of pigment makes these hard to figure out.



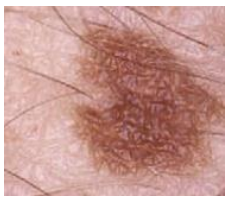
Eclipse Nevus
- Tan with brown rim.
- Named after similarity in appearance to solar eclipse.



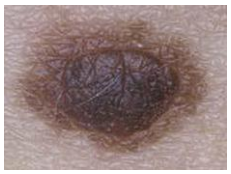
Pink Eclipse Nevus
- Eclipse nevi in fair-skinned individuals.
- high index of suspicion when patient reports changes is wise.



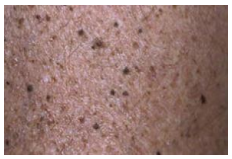
Cockade Nevus
- Target-like appearance.
- central pigmented portion.
- surrounding nonpigmented zone.
- outside peripheral pigmented rim (no nevi, just excess peripheral melanin).



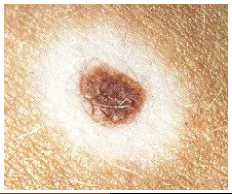
Perifollicular hypopigmented Nevus
- thin film of hypopigmentation surrounding hair.
- Often confused with an irregular border because of notched appearance.



Fried Egg Nevus
- Central raised (dermal) portion with peripheral rim.
- peripheral pigment fades with age.



Lentiginous (Cheetah) Nevi.
- Multiple dark brown to black nevi.
- admixed numerous solar lentigines.
- higher risk of melanoma given sheer number of melanocytic nevi present.



Halo nevus
- Usually seen in young adults.
- Examine central portion for atypia.
- Full body examination to exclude any lesions suspicious for melanoma.

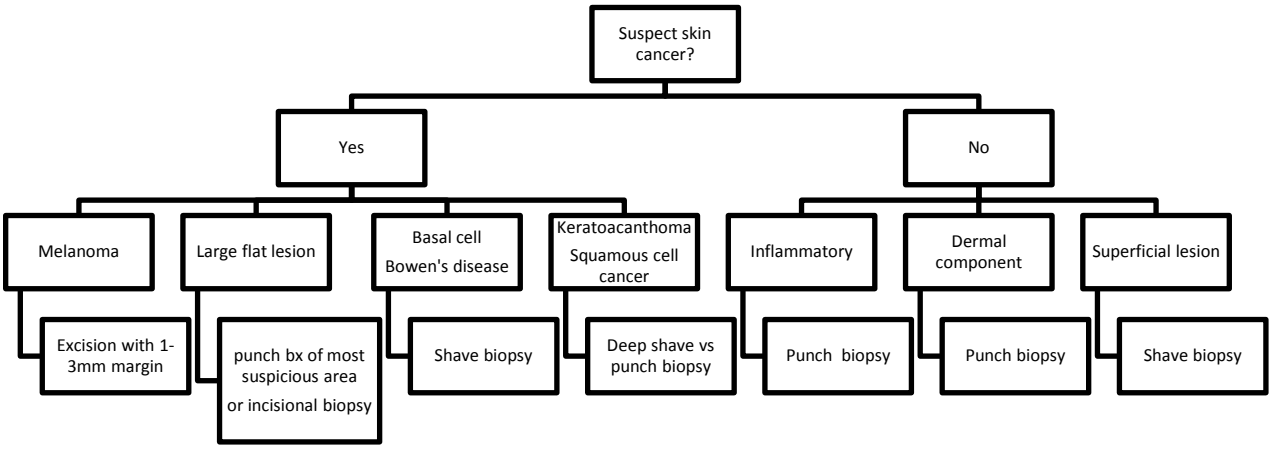
BIOPSIES: SHAVE VERSUS PUNCH

Understanding the differential diagnosis the key to determining what type of biopsy is needed. In general, punch biopsies are required when the differential diagnosis includes diseases where the diagnostic features are found in the mid-to-deep dermal layers (or adipose layer) of the specimen, under the microscope. This requires an understanding of dermatopathology. If you need the deep layers to make the diagnosis, then a punch biopsy or excisional biopsy is needed. If you don't know the depth required to make the diagnosis under the microscope, get a punch biopsy. Generally, when your differential diagnosis is actinic keratosis vs basal cell skin cancer, vs squamous cell skin cancer, a shave is fine. For most other lesions, a punch is preferred.

> If you suspect melanoma, then a complete excision of the lesion with a 1-2 mm margin is the optimal choice. If the lesion is in a cosmetically sensitive area, or an area with possible functional impairment (e.g. hands, feet, genitalia), consult a dermatologist.

The American Academy of Dermatology (AAD) guidelines and outcomes committee for cutaneous melanoma and the National Comprehensive Cancer Network (NCCN) have published recommendations for the biopsy of melanocytic lesions. The NCCN endorses the position (2007) that all patients undergo diagnostic evaluation of suspect lesions (r/o melanoma) with a 1-to 3-mm margin excision. The NCCN does allow for deep shave biopsies when the index of suspicion for melanoma is low. A major concern by both the AAD and NCCN is the possibility of missing tumor on either a lateral or deep margin when subtotal biopsy techniques are used (e.g. shave or punch biopsy). There is considerable controversy in the literature, with most studies making the point that with experienced dermatologists, a deep shave biopsy of a melanoma less than 1mm is superior to punch biopsy, as it gets more of the lesions (e.g. lateral margins) and is adequate for staging. This is not very applicable to primary care physicians who are trying to figure out whether they should shave or punch a lesion.

Full thickness excisional/incisional or punch biopsy is required for all pigmented lesions or melanocytic nevi (moles). You may hear some dermatologists and primary care practitioners use the term "scoop shave" and discuss things like, "getting underneath the lesion" with a shave. Don't be fooled. These individuals have mistakenly convinced themselves, that they can reliably get enough of a lesion to tell whether it is invasive melanoma or not. When individuals mistakenly tell you that they are sure that they got down far enough with their "scoop shave", you'll notice that they always stop short of reaching the fatty layer. That's because if they get into fat, they have to turn the biopsy into an excision, and now have to close the wound. Even some dermatologists get fooled into thinking that they can "get under the lesion" with their shaves, especially for lesions on the back. Don't make the same mistake. When I started in residency, we had plenty of "scoop shave" practitioners. Within a year or two after completing residency, I had a former fellow resident report that they "screwed up" by shaving a melanoma and not getting deep enough to stage the lesion. This person now excises or punches melanocytic lesions. The one exception is shaving nevi on the face for cosmesis, which should only be performed by dermatologists – no exceptions. Don't make the mistake of shaving a malignant melanoma off of the face, because you were not adequately trained in how to identify the subtle signs of atypia.



Adapted from: Usatine RP, et all. **Skin Surgery: A practical guide**. Mosby, Inc. 1988.

SHAVE BIOPSY

INDICATIONS

- Non-inflammatory superficial lesions
- Pyogenic granuloma
- Benign facial nevi for cosmesis
- Penile lesions
- Skin tags
- Actinic keratoses
- Basal cell skin cancer
- Squamous cell skin cancer
- Keratoacanthoma

CONTRAINDICATIONS

- Pigmented lesions suspicious for melanoma

TECHNIQUES

- Razor blade
- Scissors
- Scalpel

COMPLICATIONS

- Divot or depression
- Hypopigmentation
- Recurrence (25% recurrence rate for nevi shaved for cosmesis)
- Scarring

PUNCH BIOPSY

BASICS

- Punch size
  - 4mm standard – preferred size by dermatopathologists
  - 3mm – for small facial lesions where cosmesis is vital.

- Closure
  - All punches >2mm should be closed.
  - ≥6mm – size at which absorbable internal sutures are needed.
    - Exception scalp – absorbable internal sutures are never "required"

INDICATIONS

- Large lesions where incisional and shave biopsies not practical
- Dermal lesions.
- Inflammatory lesions (need to evaluate dermis for DDx)
- Small nevi (pick punch 2mm larger than lesion)

CONTRAINDICATIONS

- Superficial tumors (e.g. BCC or SCC).
  - Theoretical risk of seeding tumor deep into fat

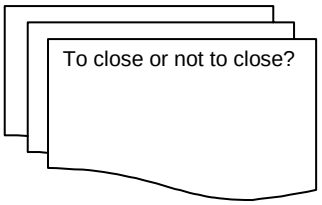
CLOSURE TECHNIQUES

- Perpendicular tension against skin tension axis.
- Lateral horizontal sutures.
- Use of oval punches

COMPLICATIONS

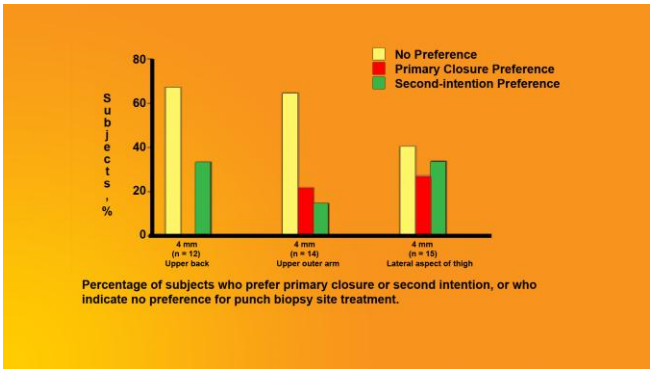
- Hypertrophic/keloid scar
- Dog ears

Mastery of the punch biopsy technique comes from a solid understanding of the mechanics of proper wound closure. When you perform a punch biopsy, you leave behind a circular defect. And it's here that our lesson begins.



When faced with such an obvious integumental defect, our initial instinct is to attempt to repair it. But, the first thing we need to determine is whether or not the hole really needs to be closed, and what happens if we let it heal by secondary intention.

In a 2005 randomized trial comparing primary closure versus second-intention healing of 4mm punch biopsy sites, there was no significant difference in scar appearance, at 9 months follow up. The sites that were allowed to close by secondary intention had gel foam applied at the time of the punch biopsy. All wounds were dressed with petrolatum, gauze, and a Tegaderm transparent dressing. Here we see the percentage of subjects plotted against no preference, primary closure, or secondary-intention healing. The majority of subjects expressed no preference in each site tested. If we look at those that did express a preference, more subjects picked second-intention healing over primary closure, in two of the three sites tested. In fact, there was no significant difference between the percentage of subjects that were "very satisfied" with their 4mm punch biopsy sites at 9 months, regardless of whether or not their lesions were closed primarily.



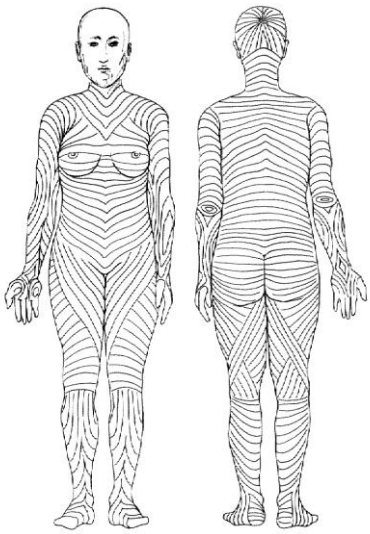
Percentage of subjects who prefer primary closure or second intention, or who indicate no preference for punch biopsy site treatment.

This study also looked at 8mm punch biopsy sites. Not surprisingly, the subjects preferred primary closure of such a large wounds in most instances. Generally, 4mm punch biopsy sites take about 3 weeks to heal if closed primarily, and 4 weeks if allowed to heal by secondary intention. Other studies have noted slow healing time for punch biopsies as a major factor in deciding whether or not to close a punch biopsy site. The question then is whether a week of extra healing will make a difference for your patients. In active healthy young patients, secondary intention healing may be an option for patients who wish to avoid the inconvenience of sutures, there limits on physical activity, and the need to return to clinic for suture removal.

Another option is the use of absorbable sutures, which eliminates the need for the patient to return to clinic for suture removal. This is a technique I have used routinely for larger wounds during military combat deployments. In a small study conducted at the University of Miami School of Medicine, in 2000, no statistical difference was found between punch biopsy sites closed using either polyglactin 910 (absorbable) or nylon (non-absorbable) suture, with regards to redness, infection, dehiscence, scar, hypertrophy and patient satisfaction.

RELAXED SKIN TENSION LINES.

Relaxed skin tension lines map out the direction of tension applied to the skin's surface. These lines run roughly perpendicular to the underlying musculature.



Skin tension lines

Dynamic skin tension lines

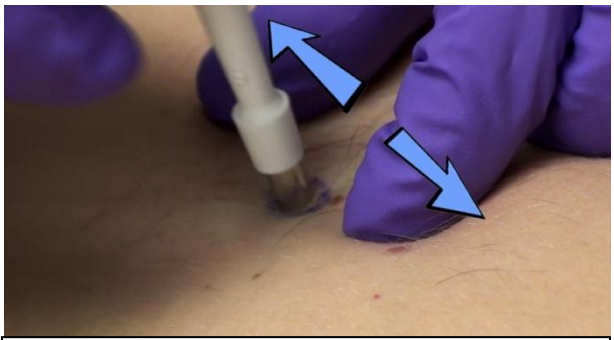
Aesthetic units

Langer's lines (cleavage lines) – lines similar to relaxed skin tension lines, that correspond to the alignment of collagen fibers in the dermis. Described by anatomist Karl Langer (1819-1887), in 1861. Langer used a circular tip tool to cut holes in cadaver's skin and observed that the hole left behind would form a predictable ellipse along axes found on the cadaver's body.

In order to leave the best possible scar, our goal is to orient the wound created by the punch, so that it will form an ellipse along the long axis of the skin tension lines. Closing a circular wound without leaving dog ears can be difficult, if not impossible in some areas. Fortunately, we have some tricks to help us form an oval wound needed for an acceptable cosmetic closure.

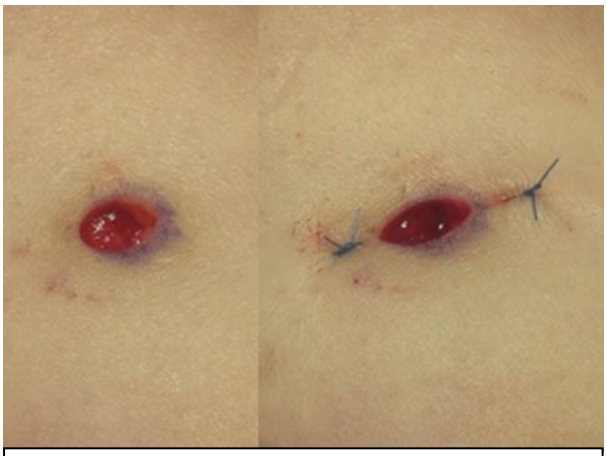
Kraissl's lines – similar to Langer's lines, but defined using living persons.

In areas with significant tension, such as the chest, the wound orients itself into an oval automatically. It's as if the wound is telling you how it wants to be closed. In other areas the lines of tension may not be so obvious. In order to help the wound form a nice oval, determine the relaxed skin tension lines by gently pinching the skin around the biopsy site. Then simply apply tension perpendicular to this axis when performing your punch biopsy. The resultant wound will then oval out nicely.



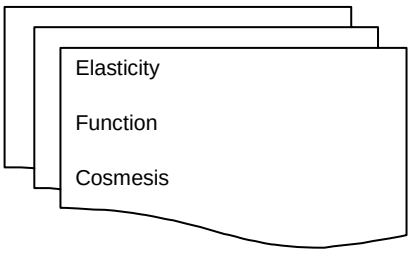
Application of tension perpendicular to skin tension axis. ©2011, Vidal EM

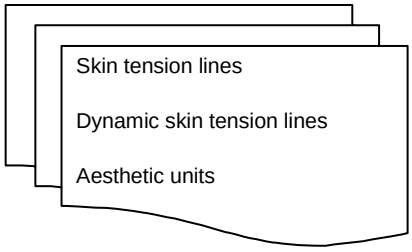
A novel technique for achieving the desired elliptical shape to a wound was described in 2005, by Matsunaga and Aiba. This technique involves placing a suture at each side of an oval wound, placing laterally oriented tension vectors to elongate an oval wound into an ellipse.



A. Punch defect. B. Ellipse formed by placing horizontal sutures at either ends. ©2011, Vidal EM

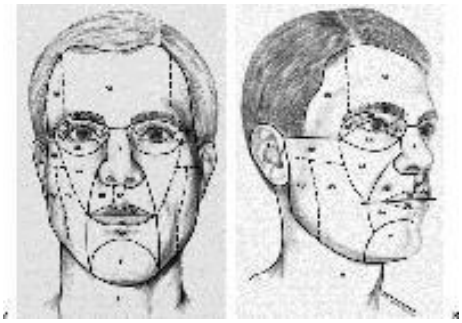
Regional differences in skin elasticity, function, and cosmesis are factors that also need to be accounted for when planning a punch biopsy.





For punch biopsies of the face, additional factors come into play. These are dynamic skin tension lines, aesthetic units, and punch size. The complex facial muscular structure is responsible for the seemingly endless expressive quality of the human face. This variety can lead to significant variation in the orientation of tension along facial wounds. In fact, rotations of up to 90 degrees have been documented in facial wounds, during facial expression, underscoring the fact that facial wound tension vectors are dynamic. Before performing any punch biopsy on a facial lesion, have the patient smile and perform some basic facial expressions to ensure that your ellipse will be oriented along dynamic skin tension lines.

Aesthetic units are facial structures that are formed by the natural contours of the face, and its many superficial landmarks.



In my experience, facial aesthetic units are more important than skin tension lines. In fact, when given a choice, it is usually best to consider angling the closure of a defect along the axis formed by the junction between two aesthetic units of the face, than worrying about skin tension lines.

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